Neste Oil Corporation & NExBTL Renewable Diesel

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On behalf of Neste Oil

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Workshop on Bioenergy
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Because I have 5 minutes, here are my CONCLUSIONS

NExBTL is a 2nd generation Renewable Diesel That Combines the benefits of GTL-diesel and Biodiesel

- Premium fuel properties like GTL
- Reduces exhaust emissions like GTL (or even lower)
- Fits existing infrastructure and engines
- CO_2 savings like Biodiesel (or even more)
- Renewable-reduces oil dependence

- Provides consistant quality from diverse feedstock
  - Waste animal fat
  - Soy, corn, canola, rape and other vegetable oils
- Provides a cleaner more energy efficient future
- California needs to keep the door open to 2nd generation renewable fuels like NExBTL and Neste is ready to help

Congratulations

- Now I want to congratulate:
  - The Commissioners,
  - The Bioenergy Interagency Workgroup,
  - The Staff and
  - Navigant Consulting
- On the preparation of an excellent draft report: “Recommendations for a Bioenergy Action Plan for California.”
- You did a great job of capturing the pros and cons of the various bioenergy sources including recent technology and creating an action plan for implementation.
- I will be talking about NESTE OIL’s new technology
  - Its strengths and weaknesses
  - Why California needs it
  - What we need to do to make it happen in California

NESTE is Ready & Able

- NESTE would enjoy doing a demonstration project with the CEC. But,
- Pilot plant work is complete and construction is underway on a 60 million gpy plant in Porvoo that will start-up in summer 2007
- It would be more fruitful to work with:
  - The California Energy Commission
  - The California Integrated Waste Management Board
  - The California Department of Food and Agriculture and
  - The California Air Resouces Board to:
- To actually identify potential plant sites and feedstock sources and determine the economic viability of NExBTL technology in California
- A copy of this summary and more details will be added to the docket.

NExBTL, A 2nd Generation Renewable Diesel

Exceptionally high quality diesel fuel made from on purpose or byproduct vegetable oils and/or animal fats

- **Renewable, pure hydrocarbon fuel**
- **Superior diesel blending component**
- **Fits into existing infrastructure- no incremental costs**
- **No storage stability problems**
- **Excellent performance in cold climates**
- **Very high cetane number (84 ... 99)**
- **Free of aromatics, sulfur, oxygen**
- **Reduces NOx, PM, HC & CO exhaust emissions**
- **Less fossil CO_2 than fossil diesel fuel**

It captures the benefits of both biodiesel and GTL diesel

Fuel Property comparison

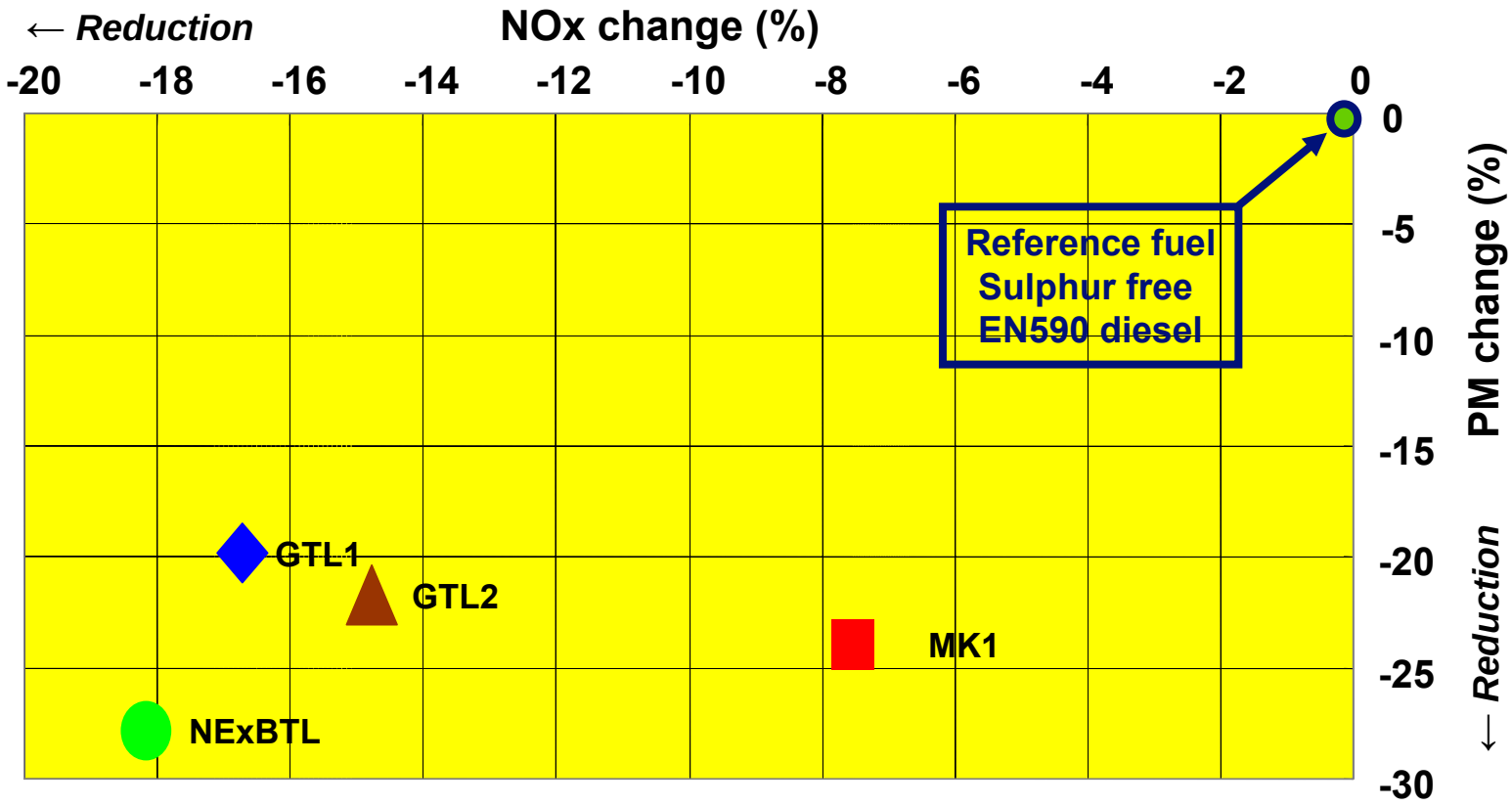
	NExBTL	GTL	FAME (RME)	Sulfur free Diesel fuel (summer)
Density at +15°C (kg/m^3)	775 ... 785	770 ... 785	≈ 885	≈ 835
Viscosity at +40°C (mm^2/s)	2.9 ... 3.5	3.2 ... 4.5	≈ 4.5	≈ 3.5
Cetane number	≈ 84 ... 99 *	≈ 73 ... 81	≈ 51	≈ 53**
Cloud point (°C)	≈ - 5 ... - 30	≈ 0 ... - 25	≈ - 5	≈ - 5
Heating value (lower) (MJ/kg)	≈ 44	≈ 43	≈ 38	≈ 43
Heating value (MJ/l)	≈ 34	≈ 34	≈ 34	≈ 36
Polyaromatic content (wt-%)	0	0	0	≈ 4
Oxygen content (wt-%)	0	0	≈ 11	0
Sulfur content (mg/kg)	< 10 (< 1)	< 10	< 10	< 10
Carbon / hydrogen	≈ 5.6	≈ 5.6		≈ 6.0

*) Blending cetane number
**) ASTM specification > 40

Specifications considerations

- NExBTL is a diesel component – It is like isooctane for diesel
- Only ASTM D-975 Diesel Fuel and/or CARB specifications should limit its maximum concentration
  - Most properties improve. Except
  - Like most ULSD products and GTL diesel lubricity additives are recommended.
- Because it is paraffins, its presence does not limit the use of biodiesel meeting ASTM D-6751 specifications.
- It increases the potential renewability of diesel.
- Standards for the use of renewable diesel fuel components need to avoid specifications that specify types of molecules or prohibit the use of second generation renewable diesel components.

NOx and PM Emission Changes in Truck Engines - NExBTL and Other Premium Diesels vs. ULSD EN590

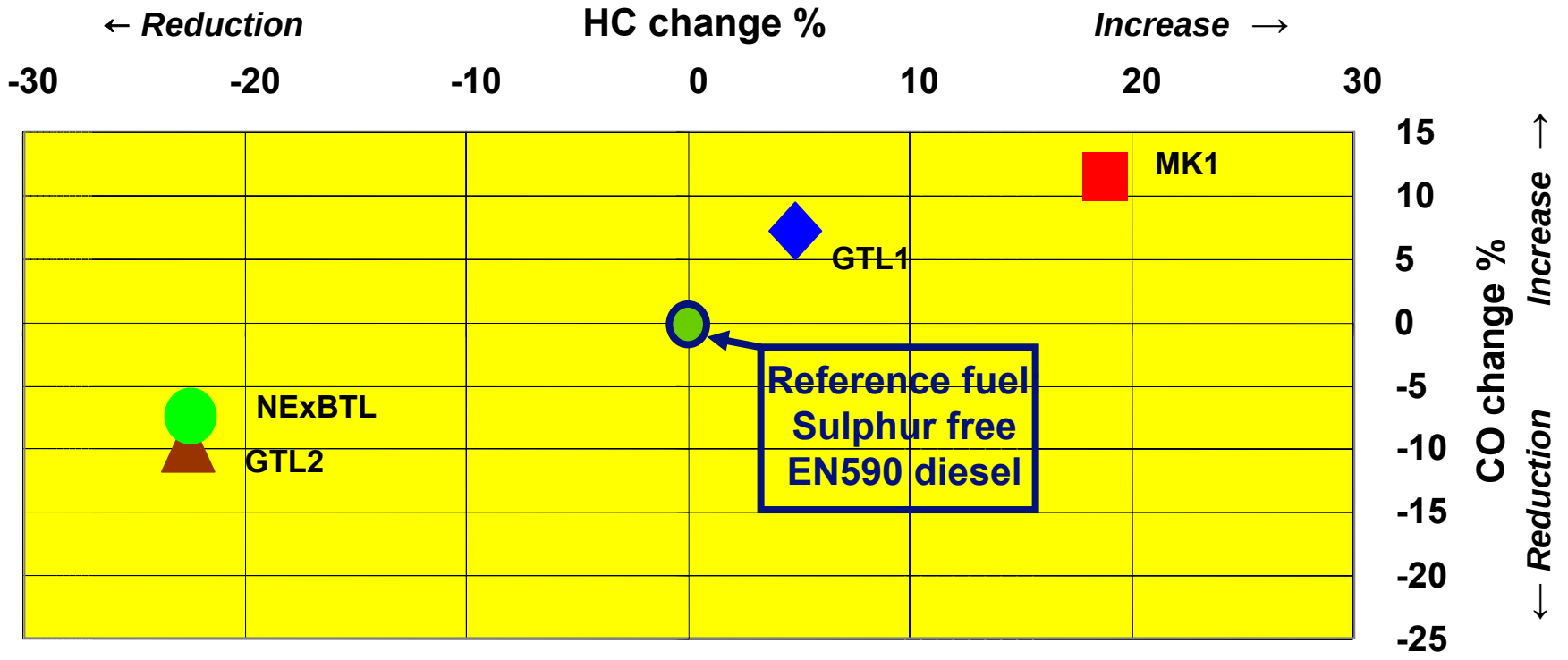


► NExBTL results in largest reductions in both NOx and PM emissions.

GTL1,2 = Gas-to-Liquid diesels; MK1 = Swedish Envir. Class 1 diesel

Source: Scania NMEC / 5th International Colloquium Fuels / Jan 12, 2005
Averages of all tests with Scania Euro 4 engine

HC and CO Emission Changes in Truck Engines - NExBTL and Other Premium Diesels vs. ULSD EN590

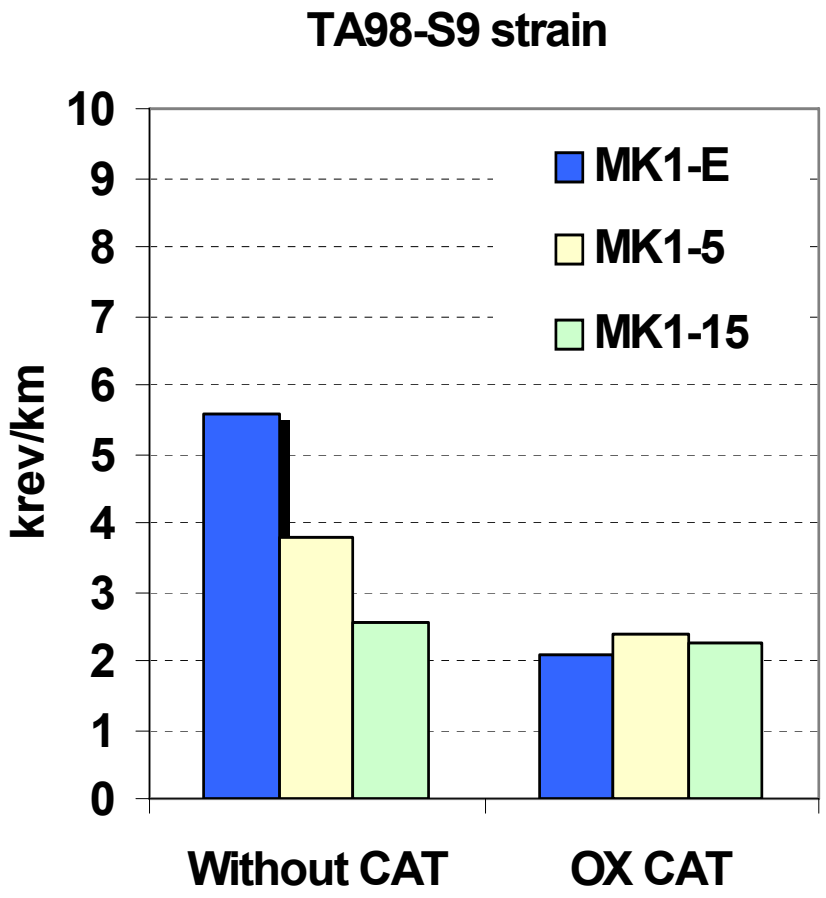


► NExBTL and GTL2 result in reductions in both HC and CO emissions, while GTL1 and MK1 are increasing the emissions.

GTL1,2 = Gas-to-Liquid diesels; MK1 = Swedish Envir. Class 1 diesel

Source: Scania NMEC / 5th International Colloquium Fuels / Jan 12, 2005
Averages of all tests with Scania Euro 4 engine

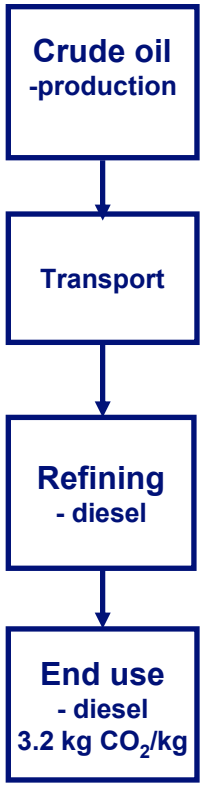
NExBTL reduces Mutagenicity



- Adding NExBTL to Swedish MK1 almost as effective as oxidation catalyst
- Could benefit older technology vehicles

$CO_{2equiv.}$ Emissions / kgoe fuel

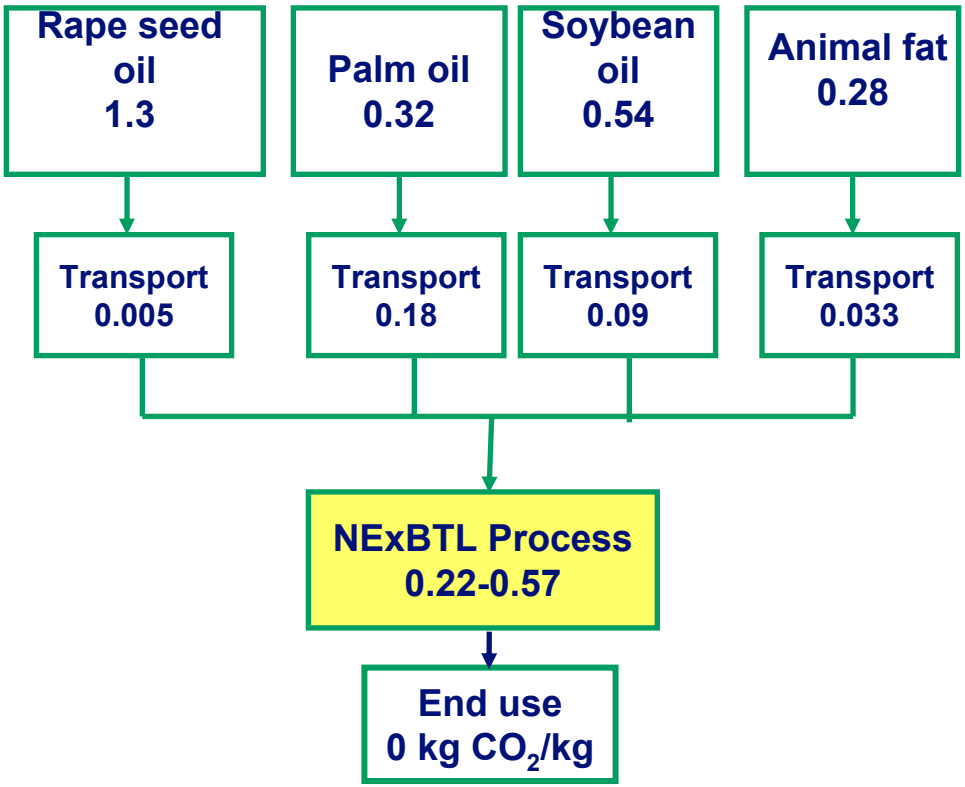
Fossil diesel



∑ 3.8 kg CO_2/kgoe fuel

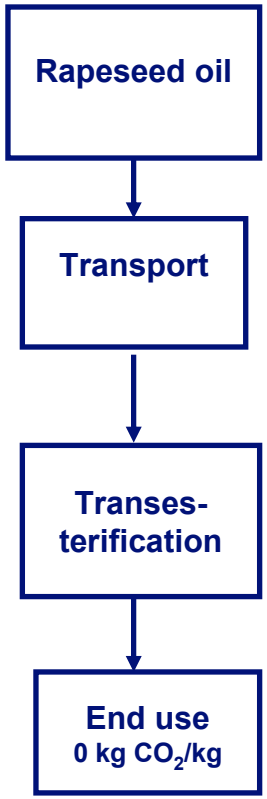
Source: Concawe/Eucar
WTW 2004

NExBTL diesel



∑ 0.5 - 1.5 kg CO_2/kgoe fuel

Biodiesel



∑ 1.6 - 2.3 kg CO_2/kgoe fuel

Source: Concawe, Shell, WTW

kgoe = kilogram oil equivalent (NExBTL 44, RME 38 MJ/kg)

NExBTL production

Feedstock
- Vegetable Oils
- Animal Fats

Feed tank

Pretreatment
Impurities removal

Solids to Power Gen at Porvoo

Hydrogen

NExBTL Process

Conversion of fatty acids to diesel fuel

Stabilization

Bio fuel gas to hydrogen or Power Gen

Water

Bio gasoline

NExBTL tank

NExBTL for blending and sale


NExBTL reaffirms Neste's strong environmental commitment.
Neste seeks quality partnerships in ensuring Renewable Diesel's role in the Renewable Fuels Market.